

**AMENDMENTS TO THE CLAIMS**

Please amend the claims as follows:

Claim 1-13 (Cancelled).

Claim 14 (New): Method for obtaining a transmission gain function for an array of antennae, comprising the steps of:

weighting a signal to be transmitted with the array of antennae by a transmission weighting vector  $\bar{b}_d$  with  $N$  complex coefficients, wherein  $N$  is a number of antennae in the array of antennae;

transmitting from the array of antennae to a telecommunication terminal over a downlink channel a downlink transmission signal  $S_d$ , wherein the downlink channel is disturbed by at least one of an isotropic noise  $N'$  and a downlink interference  $I_d$ ;

transmitting from the telecommunication terminal to the array of antennae over an uplink channel an uplink transmission signal  $S_u$ ; and

determining the transmission weighting vector  $\bar{b}_d$  by a matrix product from a noise power matrix  $D_d$ , wherein the noise power matrix  $D_d$  is a function of a power of said isotropic noise  $N'$ , a power of said downlink interference  $I_d$  and a downlink channel vector  $\bar{C}_d$ , said downlink channel vector representing an angular sampling of a transfer function of the downlink channel in  $M$  directions  $k$ ,  $k=0, \dots, M-1$ , belonging to an angular range covered by the array of antennae.

Claim 15 (New): Method for obtaining a transmission gain function according to Claim 14, wherein said downlink channel vector  $\bar{C}_d$  is obtained from variations in a transfer function of the uplink channel.

Claim 16 (New): Method for obtaining a transmission gain function according to Claim 15, wherein said downlink channel vector  $\bar{C}_d$  is obtained from variations  $\overline{\Delta C}_u$  in a uplink channel vector  $\bar{C}_u$ , said uplink channel vector represents an angular sampling of the transfer function of the uplink channel in said  $M$  directions.

Claim 17 (New): Method for obtaining a transmission gain function according to Claim 16, wherein variations  $\overline{\Delta C}_d$  in the downlink channel vector  $\bar{C}_d$  are obtained from the variations  $\overline{\Delta C}_u$  in the uplink channel.

Claim 18 (New): Method for obtaining a transmission gain function according to Claim 17, wherein variations  $\Delta c_{dk}$  in components  $c_{dk}$  of the downlink channel vector  $\bar{C}_d$  are obtained by using variations  $\Delta c_{uk}$  in components  $c_{uk}$  of the uplink vector by an equation:

$$\Delta c_{dk} / c_{dk} = f_d / f_u \cdot \Delta c_{uk} / c_{uk},$$

wherein  $f_u$  is a frequency used on said uplink channel and  $f_d$  is a frequency used on said downlink channel.

Claim 19 (New): Method for obtaining a transmission gain function according to Claim 18, wherein said downlink channel vector  $\bar{C}_d$  is obtained by integrating the variations  $\overline{\Delta C}_d$  into said downlink channel vector  $\bar{C}_d$  and an initial value  $\bar{C}_d(0)$  is transmitted by the telecommunications terminal to said array of antennae.

Claim 20 (New): Method for obtaining a transmission gain function according to Claim 14, wherein the noise power matrix  $D_d$  is further a diagonal matrix of a size  $M \cdot M$  and with matrix components

$$\sqrt{\sigma_{dk}^2 + \gamma_d N_0' / I_d},$$

wherein  $\sigma_{dk}^2$  is a power of the downlink interference in the direction  $k$ ,  $N_0'$  is a power of the isotropic noise,  $\gamma_d = 1 / \|\bar{C}_d\|^2$  and  $I_d$  is a total power of the downlink interference.

Claim 21 (New): Method for obtaining a transmission gain function according to Claim 14, wherein the array of antennae transmitting over a plurality of downlink channels a plurality of transmission signals to a plurality of telecommunication terminals and receiving from them a plurality of transmission signals transmitted over a plurality of uplink channels, wherein each downlink channel  $j$  relating to a terminal  $j$  of said plurality telecommunication terminals is associated with a transmission weighting vector  $\bar{b}_d(j)$ , a second noise matrix relating to the downlink channel  $j$  is a diagonal matrix of size  $M \cdot M$  with matrix components

$$\sqrt{\sigma_{dk}^2(j) + \gamma_d(j) \cdot N_0' / I_d(j)},$$

wherein  $\sigma_{dk}^2(j)$  is a power of the downlink interference for the downlink channel  $j$  in the direction of  $k$ ,  $\gamma_d(j)$  is a coefficient representing a power transfer over the downlink channel  $j$ ,  $N_0'$  is a power of the second isotropic noise, and  $I_d(j)$  is a total power of the downlink interference.

Claim 22 (New): Method for obtaining a transmission gain function according to Claim 21, wherein the coefficient  $\gamma_d(j)$  is transmitted to the array of antennae by the terminal  $j$  on the corresponding uplink channel.

Claim 23 (New): Method for obtaining a transmission gain function according to Claim 21, wherein the coefficient  $\gamma_d(j)$  is estimated by a base station from a coefficient  $\Gamma$  characterizing the power transfer in the uplink direction.

Claim 24 (New): Method for obtaining a transmission gain function according to Claim 21, wherein for a given downlink channel  $j$ , the downlink interference power in the direction  $k$ ,  $\sigma_{dk}^2(j)$ , is estimated according to the power of the downlink transmission signals  $S_d(j')$  on the downlink channels  $j'$  distinct from  $j$ , a coefficient  $\beta_d(j)$  characterizing an orthogonality of the downlink channel  $j$ , the components  $g_{dk}(j')$  of the gain vectors  $\bar{G}_d(j')$  relating to said distinct downlink channels  $j'$  distinct from  $j$ , the gain vectors consisting of an angular sampling in said  $M$  directions of the transmission gain functions obtained for the distinct downlink channels  $j'$  distinct from  $j$ .

Claim 25 (New): Method for obtaining a transmission gain function according to Claim 24, wherein the coefficient  $\beta_d(j)$  is estimated from a coefficient characterizing the orthogonality of the uplink channel  $j$ .

Claim 26 (New): Transmission device for a base station in a mobile telecommunication system, comprising:

an array of  $N$  antennae,

weighting means for weighting the signal to be transmitted  $S_d$  by said array of antennae with a transmission weighting vector  $\bar{b}_d$  of  $N$  complex coefficients, wherein the weighting means comprises

calculation means adapted to implement the method of obtaining the transmission gain function according to Claim 14, said calculation means supplying to said weighting means said transmission weighting vector  $\bar{b}_d$ .

Claim 27 (New): Method for obtaining a transmission gain function according to Claim 16, wherein variations  $\Delta c_{dk}$  in components  $c_{dk}$  of the downlink channel vector  $\bar{C}_d$  are obtained by using variations  $\Delta c_{uk}$  in components  $c_{uk}$  of the uplink vector by an equation:

$$\Delta c_{dk} / c_{dk} = f_d / f_u \cdot \Delta c_{uk} / c_{uk},$$

wherein  $f_u$  is a frequency used on said uplink channel and  $f_d$  is a frequency used on said downlink channel.

Claim 28 (New): Method for obtaining a transmission gain function according to Claim 17, wherein said downlink channel vector  $\bar{C}_d$  is obtained by integrating the variations  $\Delta \bar{C}_d$  into said downlink channel vector  $\bar{C}_d$  and an initial value  $\bar{C}_d(0)$  is transmitted by the telecommunications terminal to said array of antennae.

Claim 29 (New): Method for obtaining a transmission gain function according to Claim 15, wherein the noise power matrix  $D_d$  is further a diagonal matrix of a size  $M \cdot M$  and with matrix components

$$\sqrt{\sigma_{dk}^2 + \gamma_d N_0} / I_d,$$

wherein  $\sigma_{dk}^2$  is a power of the downlink interference in the direction  $k$ ,  $N_0$  is a power of the isotropic noise,  $\gamma_d = 1 / \|\bar{C}_d\|^2$  and  $I_d$  is a total power of the downlink interference.

Claim 30 (New): Method for obtaining a transmission gain function according to Claim 18, wherein the noise power matrix  $D_d$  is further a diagonal matrix of a size  $M \cdot M$  and with matrix components

$$\sqrt{\sigma_{dk}^2 + \gamma_d N_0' / I_d},$$

wherein  $\sigma_{dk}^2$  is a power of the downlink interference in the direction  $k$ ,  $N_0'$  is a power of the isotropic noise,  $\gamma_d = 1 / \|\bar{C}_d\|^2$  and  $I_d$  is a total power of the downlink interference.

Claim 31 (New): Method for obtaining a transmission gain function according to Claim 18, wherein the array of antennae transmitting over a plurality of downlink channels a plurality of transmission signals to a plurality of telecommunication terminals and receiving from them a plurality of transmission signals transmitted over a plurality of uplink channels, wherein each downlink channel  $j$  relating to a terminal  $j$  of said plurality telecommunication terminals is associated with a transmission weighting vector  $\bar{b}_d(j)$ , a second noise matrix relating to the downlink channel  $j$  is a diagonal matrix of size  $M \cdot M$  with matrix components

$$\sqrt{\sigma_{dk}^2(j) + \gamma_d(j) \cdot N_0' / I_d(j)},$$

wherein  $\sigma_{dk}^2(j)$  is a power of the downlink interference for the downlink channel  $j$  in the direction of  $k$ ,  $\gamma_d(j)$  is a coefficient representing a power transfer over the downlink channel  $j$ ,  $N_0'$  is a power of the second isotropic noise, and  $I_d(j)$  is a total power of the downlink interference.

Claim 32 (New): Method for obtaining a transmission gain function according to Claim 18, wherein for a given downlink channel  $j$ , the downlink interference power in the direction  $k$ ,  $\sigma_{dk}^2(j)$ , is estimated according to the power of the downlink transmission signals

$S_d(j')$  on the downlink channels  $j'$  distinct from  $j$ , a coefficient  $\beta_d(j)$  characterizing an orthogonality of the downlink channel  $j$ , the components  $g_{dk}(j')$  of the gain vectors  $\bar{G}_d(j')$  relating to said distinct downlink channels  $j'$  distinct from  $j$ , the gain vectors consisting of an angular sampling in said  $M$  directions of the transmission gain functions obtained for the distinct downlink channels  $j'$  distinct from  $j$ .

Claim 33 (New): Transmission device for a base station in a mobile telecommunication system, comprising:

an array of  $N$  antennae,  
weighting means for weighting a signal to be transmitted  $S_d$  by said array of antennae with a transmission weighting vector  $\bar{b}_d$  of  $N$  complex coefficients, wherein the weighting means comprises:

calculation means adapted to implement the method of obtaining the transmission gain function according to Claim 18, said calculation means supplying to said weighting means the transmission weighting vector  $\bar{b}_d$ .